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Nanotechnology path to Sustainable Society

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Nanoscale science and engineering supports a foundational technology with implications on sustainability of economy, environment and overall societal development. Special challenges are balanced, equitable and safe affirmation of the technology. By establishing controlled synthesis and processing of matter at the nanoscale, nanotechnology would require fewer amounts of materials, water, and energy; and with the high degree of precision in nanomanufacturing we are generating less pollution for the same functionality. This presentation will focus on evolution of priorities since 2000. The long-view of nanotechnology development has three stages, each dominated by a different focus: phenomenological basics and synthesis of nanocomponents (2000-2010), nanosystem integration by design for fundamentally new products (2010-2020), and creation of new technology platforms based on new nanosystem architectures (2020-2030)(www.wtec.org/nano2/). Such development raises significant sustainability opportunities and challenges. Nanoscale science and engineering is expected to converge with biotechnology, information technology, cognitive technologies and other knowledge and technology domains resulting in an increase of the complexity and uncertainty of the secondary effects ("Converging Knowledge, Technology and Society: Beyond Nano-Bio-Info-Cognitive Technologies", Springer 2013, www.wtec.org/NBIC2-Report/). Nanotechnology development and sustainability are seen as two key interdependent invariants for future society. Convergence principles can provide guidance how to plan and better implement sustainable nanotechnology.

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